

Amendment and Response

Applicant: Victor T. Escobedo et al.

Serial No.: 10/608,642

Filed: June 27, 2003

Docket No.: 200207746-1

Title: PRINthead ORIENTATION

IN THE CLAIMS

Please cancel claim 6 without prejudice.

Please amend claims 1, 5, 10, 14-16, 28, 33, 34, 36, 38-40, 44, and 48 as follows:

1. (Currently Amended) A printhead for printing on a print media, the printhead comprising:

~~a column of nozzles~~ a first column of nozzles and a second column of nozzles each oriented at an angle to an axis of relative movement between the printhead and the print media; and

a print axis oriented substantially parallel to the axis of relative movement between the printhead and the print media,

wherein the first column of nozzles and the second column of nozzles are oriented substantially parallel to each other and substantially overlap in a direction substantially perpendicular to the print axis, wherein at least some of the nozzles including at one nozzle of the first column of nozzles and at least one nozzle of the second column of nozzles are variably aligned to the print axis.

2. (Original) The printhead of claim 1, wherein the at least some of the nozzles are intersected by the print axis.

3. (Original) The printhead of claim 1, wherein one of the at least some of the nozzles is offset a first distance from the print axis and another of the at least some of the nozzles is offset a second distance from the print axis, wherein the second distance differs from the first distance.

4. (Original) The printhead of claim 1, wherein one of the at least some of the nozzles is offset from the print axis in a first direction and another of the at least some of the nozzles is offset from the print axis in a second direction opposite the first direction.

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5. (Currently Amended) The printhead of claim 1, wherein the at least some of the nozzles includes adjacent nozzles of the column of nozzles of at least one of the first column of nozzles and the second column of nozzles.

6. (Cancelled)

7. (Original) The printhead of claim 1, wherein the angle is an acute angle.

8. (Original) The printhead of claim 1, wherein the printhead is a non-scanning printhead.

9. (Original) The printhead of claim 1, wherein the printhead is a scanning printhead.

10. (Currently Amended) A printhead for printing on a print media, the printhead comprising:

a plurality of nozzles divided into subgroups of nozzles and including at least one column of nozzles a first column of nozzles and a second column of nozzles each oriented at an angle to an axis of relative movement between the printhead and the print media; and

a plurality of print axes oriented substantially parallel to the axis of relative movement between the printhead and the print media,

wherein the first column of nozzles and the second column of nozzles are oriented substantially parallel to each other and substantially overlap in a direction substantially perpendicular to the print axes, wherein nozzles within each one of the subgroups are variably aligned to one of the print axes.

11. (Original) The printhead of claim 10, wherein nozzles within each one of the subgroups are intersected by one of the print axes.

12. (Original) The printhead of claim 10, wherein one of the nozzles within one of the subgroups is offset a first distance from one of the print axes and another of the nozzles

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within the one of the subgroups is offset a second distance from the one of the print axes, wherein the second distance differs from the first distance.

13. (Original) The printhead of claim 10, wherein one of the nozzles within one of the subgroups is offset from one of the print axes in a first direction and another of the nozzles within the one of the subgroups is offset from the one of the print axes in a second direction opposite the first direction.

14. (Currently Amended) The printhead of claim 10, wherein at least one of the subgroups of nozzles includes multiple nozzles ~~of the at least one column of nozzles~~ of at least one of the first column of nozzles and the second column of nozzles.

15. (Currently Amended) The printhead of claim 10, wherein at least one of the subgroups of nozzles includes adjacent nozzles ~~of the at least one column of nozzles~~ of at least one of the first column of nozzles and the second column of nozzles.

16. (Currently Amended) The printhead of claim 10, ~~wherein the at least one column of nozzles includes a first column of nozzles and a second column of nozzles spaced from and oriented substantially parallel to the first column of nozzles, and~~ wherein at least one of the subgroups of nozzles includes at least one nozzle of the first column of nozzles and at least one nozzle of the second column of nozzles.

17. (Original) The printhead of claim 10, wherein the printhead is adapted to eject fluid through all of the nozzles within one of the subgroups to produce a dot pattern along one of the print axes.

18. (Original) The printhead of claim 10, wherein the printhead is adapted to eject fluid through less than all of the nozzles within one of the subgroups to produce a dot pattern along one of the print axes.

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19. (Original) The printhead of claim 10, wherein the printhead is adapted to eject fluid through only one of the nozzles within one of the subgroups to produce a dot pattern along one of the print axes.
20. (Original) The printhead of claim 10, wherein the printhead is adapted to eject fluid through any one of the nozzles within one of the subgroups to produce a dot pattern along one of the print axes.
21. (Original) The printhead of claim 10, wherein the printhead is adapted to eject fluid through multiple nozzles within one of the subgroups to print overlapping dots along one of the print axes.
22. (Original) The printhead of claim 21, wherein the overlapping dots increase resolution.
23. (Original) The printhead of claim 21, wherein the overlapping dots increase dot size.
24. (Original) The printhead of claim 10, wherein the printhead is adapted to eject fluid through multiple nozzles within one of the subgroups to print multiple dots along one of the print axes.
25. (Original) The printhead of claim 10, wherein the angle is an acute angle.
26. (Original) The printhead of claim 10, wherein the printhead is a non-scanning printhead.
27. (Original) The printhead of claim 10, wherein the printhead is a scanning printhead.
28. (Currently Amended) A printhead arrangement for printing on a print media, the printhead arrangement comprising:
a first printhead including a first plurality of nozzles; and

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a second printhead adjacent the first printhead and including a second plurality of nozzles,

wherein the first plurality of nozzles of the first printhead and the second plurality of nozzles of the second printhead each include at least one column of nozzles oriented at an angle to an axis of relative movement between the printhead arrangement and the print media, and

wherein at least one nozzle of the first plurality of nozzles and at least one nozzle of the second plurality of nozzles is included in a subgroup of nozzles each variably aligned to one of a plurality of print axes oriented substantially parallel to the axis of relative movement between the printhead arrangement and the print media,

wherein the first plurality of nozzles and the second plurality of nozzles substantially overlap in a direction substantially perpendicular to the print axes.

29. (Original) The printhead arrangement of claim 28, wherein nozzles within the subgroup of nozzles are intersected by the one of the print axes.

30. (Original) The printhead arrangement of claim 28, wherein one of the nozzles within the subgroup of nozzles is offset a first distance from the one of the print axes and another of the nozzles within the subgroup of nozzles is offset a second distance from the one of the print axes, wherein the second distance differs from the first distance.

31. (Original) The printhead arrangement of claim 28, wherein one of the nozzles within the subgroup of nozzles is offset from the one of the print axes in a first direction and another of the nozzles within the subgroup of nozzles is offset from the one of the print axes in a second direction opposite the first direction.

32. (Original) The printhead arrangement of claim 28, wherein the angle is an acute angle.

33. (Currently Amended) A printhead for printing on a print media, the printhead comprising:

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~~nozzles~~ a first column of nozzles and a second column of nozzles;

a print axis oriented substantially parallel to an axis of relative movement between the printhead and the print media; and

means for variably aligning at least some of the nozzles including at one nozzle of the first column of nozzles and at least one nozzle of the second column of nozzles to the print axis,

wherein the first column of nozzles and the second column of nozzles are oriented substantially parallel to each other and substantially overlap in a direction substantially perpendicular to the print axis.

34. (Currently Amended) The printhead of claim 33, wherein means for variably aligning at least some of the nozzles includes ~~a column of the nozzles~~ the first column of nozzles and the second column of nozzles oriented at an angle to the axis of relative movement between the printhead and the print media.

35. (Original) The printhead of claim 33, wherein means for variably aligning at least some of the nozzles further includes means for varying an offset distance from the print axis to the at least some of the nozzles.

36. (Currently Amended) The printhead of claim 35, wherein means for varying the offset distance includes ~~a column of the nozzles~~ the first column of nozzles and the second column of nozzles oriented at varied angles to the axis of relative movement between the printhead and the print media.

37. (Original) The printhead of claim 33, wherein means for variably aligning at least some of the nozzles further includes means for varying a number of the at least some of the nozzles.

38. (Currently Amended) The printhead of claim 37, wherein means for varying the number of the at least some of the nozzles includes ~~a column of the nozzles~~ the first column

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of nozzles and the second column of nozzles oriented at varied angles to the axis of relative movement between the printhead and the print media.

39. (Currently Amended) A printhead for printing on a print media, the printhead comprising:

a plurality of nozzles divided into subgroups of nozzles and including a first column of nozzles and a second column of nozzles;

a plurality of print axes oriented substantially parallel to an axis of relative movement between the printhead and the print media; and

means for variably aligning nozzles within each one of the subgroups to one of the print axes,

wherein the first column of nozzles and the second column of nozzles are oriented substantially parallel to each other and substantially overlap in a direction substantially perpendicular to the print axes.

40. (Currently Amended) The printhead of claim 39, wherein means for variably aligning the nozzles includes ~~a column of the nozzles~~ the first column of nozzles and the second column of nozzles oriented at an angle to the axis of relative movement between the printhead and the print media.

41. (Original) The printhead of claim 39, wherein means for variably aligning the nozzles further includes means for varying an offset distance from one of the print axes to the nozzles within each one of the subgroups.

42. (Original) The printhead of claim 41, wherein means for varying the offset distance provides means for varying resolution of the printhead.

43. (Original) The printhead of claim 41, wherein means for varying the offset distance provides means for varying dot size along the print axes.

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44. (Currently Amended) The printhead of claim 41, wherein means for varying the offset distance includes ~~a column of the nozzles~~ the first column of nozzles and the second column of nozzles oriented at varied angles to the axis of relative movement between the printhead and the print media.
45. (Original) The printhead of claim 39, wherein means for variably aligning the nozzles further includes means for varying a number of nozzles within the subgroups.
46. (Original) The printhead of claim 45, wherein means for varying the number of nozzles within the subgroups provides means for varying print speed of the printhead.
47. (Original) The printhead of claim 45, wherein means for varying the number of nozzles within the subgroups provides means for varying nozzle redundancy along the print axes.
48. (Currently Amended) The printhead of claim 45, wherein means for varying the number of nozzles within the subgroups includes ~~a column of the nozzles~~ the first column of nozzles and the second column of nozzles oriented at varied angles to the axis of relative movement between the printhead and the print media.